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Medical News Letter

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United States Navy

MEDICAL NEWS LETTER

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, giving full name, rank, corps, and old and new addresses.

FRONT COVER: The original U. S. Naval Hospital, Great Lakes, Illinois was commissioned in 1911. With four wards and sick officers' room, it then offered a capacity of only 81 beds. The operating rooms were illuminated by skylights during the day and a cluster of five tungsten lamps at night.

The old hospital was doing its share in caring for the wounded of World War I, when an influenza epidemic broke out in the Fall of 1918. Its capacity was increased to admit as many as 300 patients in one day.

Upon U. S. entry into the second World War, there was an immediate increase in admissions. Casualties filled the hospital to capacity. During 1943 there were 38,384 admissions. The all time peak was 8,179 in-patients.

The new $15,000,000, 1,000 bed hospital was dedicated on 9 December 1960, operational on 3 January, 1961, and is a modern structure in every respect. The 12-story hospital, with a basement and two story penthouse, occupies approximately 5,877,000 cubic feet. The building has a concrete foundation, structural steel framing, steel joists, concrete floors, and brick faced exterior walls with brick backup. The hospital, so constructed that 1000 beds can easily be added, is the finest Naval Hospital between Philadelphia and San Francisco.

The 100% air-conditioned hospital features a closed circuit television system, piped in oxygen; a network of eight elevators and many other facilities.

Great Lakes was chosen for the site of a Hospital Corps School which opened in February 1942. The first class graduated one month later. Five hundred student corpsmen were graduating every three months.

At the present time the Hospital and Hospital Corps School are staffed with about 225 officers, including Medical Corps, and Dental Corps, Medical Service Corps, Nurse Corps, Chaplain Corps, and Civil Engineer Corps Officers; 450 enlisted personnel; and 415 civilians. The Hospital Corps School has a student body varying from 500 to 1000 personnel. Classes are convened every week and are of 16 weeks duration.

The Great Lakes Naval Hospital is a general and teaching hospital providing services for active duty and retired Navy, Marine, Army and Air Force personnel and their dependents.—Editor

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

MEDICAL ARTICLE

SURGICAL MANAGEMENT OF TRAUMATIC INTRACARDIAC LESIONS*

Arthur C. Beall, Jr., MD, Harold F. Hamit, MD, Denton A. Cooley, MD, and Michael E. De Bakey, MD.

Sixty-seven years have passed since the first successful clinical cardiorrhaphy for trauma.[8] During this period of time methods of treating cardiac wounds have varied greatly.[2] Regardless of the primary method of management, however, intracardiac lesions following trauma present a unique problem to the surgeon. Until recently, such injuries were considered to be only of academic interest.

With development of satisfactory technics of total cardiopulmonary bypass and their widespread clinical application in open heart surgery, traumatic intracardiac lesions now are within the realm of surgical correction.[1] Six patients with such defects have been managed successfully with the aid of cardiopulmonary bypass in the city-county hospitals of Houston and Harris County, Texas. Review of this experience demonstrates the need for accurate anatomical diagnosis and definitive repair of the intracardiac lesion following recovery from the acute episode associated with injury and forms the basis for this report.

PLAN OF MANAGEMENT

All patients with thoracic trauma are seen first in the emergency room, which is equipped for any eventuality. They are disrobed completely, in order that no associated injury will go unrecognized, and are examined promptly for the presence of shock or pericardial tamponade, for signs of intrathoracic injury, and for status of peripheral pulses. Simultaneously, a route for the rapid intravenous administration of fluids and drugs is established, and blood is obtained for laboratory examination and for typing and crossmatching. Crystalloid and colloid solutions, vasopressors, and whole blood are given as indicated.

Sucking wounds of the chest are closed rapidly by Vaseline® gauze pressure dressings or temporary suture. Hemothorax and/or pneumothorax are managed by immediate institution of intercostal thoracostomy tube drainage. If the patient's condition permits, roentgenographic and electrocardiographic

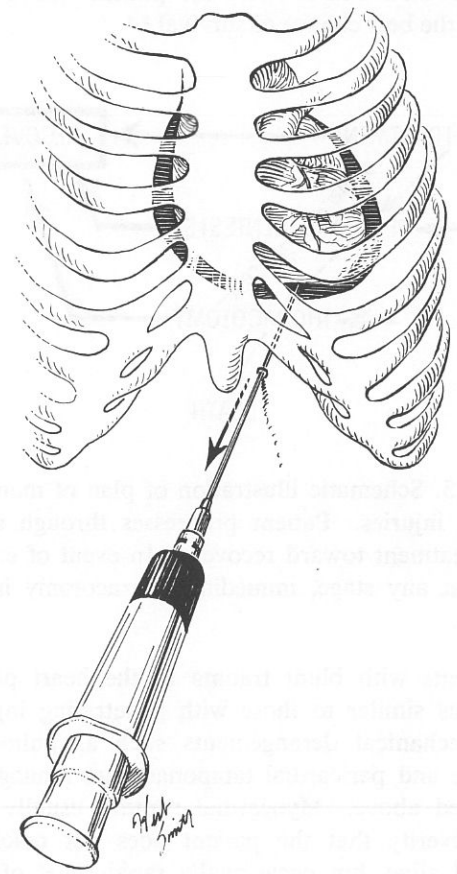

Fig. 2. (Frontispiece.) Drawing illustrating technic of pericardicentesis by paraxyphoid approach.

* From the Cora and Webb Mading Department of Surgery, Baylor University College of Medicine, and the Jefferson Davis and Ben Taub General Hospitals, Houston, Texas.

Supported in part by the U.S. Army Research and Development Command, Contract No. DA-49-007-MD-2523, and the U.S. Public Health Service (HE-03137) and (HE-5387).

Read before the Twenty-fourth Annual Session of the American Association for the Surgery of Trauma, Chicago, Illinois, October 1-3, 1964.

Reprint address: Arthur C. Beall, Jr., MD, Cora and Webb Mading Department of Surgery, Baylor University College of Medicine, Houston, Texas 77025.

examinations are performed. However, if signs of pericardial tamponade are present or the patient fails to respond to the above measures, pericardicentesis is performed without delay (Fig. 2), often simultaneously with examination and onset of therapy. If the patient's condition is stable without pericardicentesis or stabilizes following a single pericardial aspiration, he is taken to the recovery room for intensive observations. Otherwise, he is taken rapidly to the operating room where pericardicentesis again is performed. Should response to the second pericardial aspiration be immediate and lasting, the patient is moved to the recovery room; if not, the pericardial needle is left in place and cardiorrhaphy is performed. Should cardiac arrest occur at any time, immediate thoracotomy is performed, whether in the emergency room, recovery room, or operating room. By this plan of management (Fig. 3) all deaths, of necessity, fall into the operative group and statistical comparison of groups is meaningless. Nevertheless, experience with this method of management over more than a decade and a half was demonstrated that it offers the patient with a heart wound the best chance of survival.[2,4]

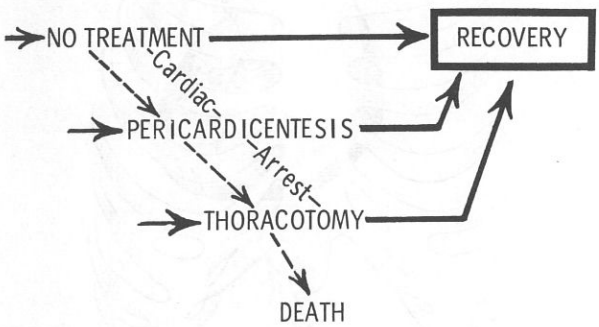

Fig. 3. Schematic illustration of plan of managing cardiac injuries. Patient progresses through necessary treatment toward recovery. In event of cardiac arrest at any stage, immediate thoracotomy is performed.

Patients with blunt trauma to the heart present problems similar to those with penetrating injuries, and mechanical derangements such as pulmonary collapse and pericardial tamponade are managed as described above. Myocardial rupture usually is of such severity that the patient does not reach the hospital alive, but occasionally rapid relief of tamponade and cardiorrhaphy will result in salvage.[6] Most common among cardiac injuries resulting from blunt trauma are myocardial contusions and partial thickness lacerations which usually resolve without specific therapy.[7] These patients, therefore, generally require only supportive care, reserving specific therapy for the rare case of intracardiac injury.[3]

Both penetrating and nonpenetrating injuries of the heart may result in intracardiac damage, and these injuries may or may not be associated with significant hemodynamic alterations depending upon the structures involved and the magnitude of the injury. Prior to definitive therapy for those intracardiac injuries which require correction, an accurate anatomical diagnosis by catheterization and/or angiographic studies is necessary. Therefore, in spite of immediate availability of total cardiopulmonary bypass using disposable plastic oxygenators* primed with five per cent dextrose in distilled water,[5] definitive repair of the intracardiac defect is not possible at the time of primary therapy even if cardiorrhaphy is required or elected.[1] Methods of primary management thus are selected on their own individual merits, as described above, rather than predicated on the possibility or presence of an intracardiac injury. Management of the six cases to be presented will be considered separately then in regard to primary and to definitive therapy.[4]

CLINICAL MATERIAL

Experience with open heart surgery employing total cardiopulmonary bypass in the Baylor University College of Medicine Affiliated Hospitals now exceeds 2800 clinical cases, allowing familiarity with numerous congenital and acquired cardiac lesions similar to the six traumatic intracardiac injuries to be described. Through a combination of geographical and racial factors, an extremely large volume of trauma is routed to two of these hospitals, Jefferson Davis and Ben Taub General, the city-county hospitals for the indigent of Houston and Harris County, Texas. Between 1950 and 1963 there were 177 patients with penetrating cardiac wounds alive on admission to these hospitals, and their management was reported in detail elsewhere.[2,4] From this clinical material the described methods of management evolved and the following six cases were drawn, as summarized in Table I.

Case Reports

Case 1: A 24-year-old man was admitted to the hospital on September 16, 1956, in profound shock following multiple stab wounds of the chest and

* Travenol Laboratories, Inc., Morton Grove, Illinois.

TABLE I

Summary of Patients with Traumatic Intracardiac Defects

Case	Age	Sex	Method of Injury	Anatomic Diagnosis	Management of Cardiac Injury		Results
					Primary	Definitive	
1	24	Male	Stab wound	Aortic-right ventricular fistula	None	Open suture repair	Asymptomatic
2	50	Male	Stab wound	Aortic-right ventricular fistula	Pericardicentesis	Open suture repair	Asymptomatic
3	44	Male	Stab wound	Aortic-right ventricular fistula	Pericardicentesis	Open suture repair	Asymptomatic
4	28	Male	Stab wound	Interventricular septal defect	Pericardicentesis	Open suture repair	Asymptomatic
5	39	Female	Blunt trauma	Aortic valve regurgitation	None	1) Open suture repair 2) Prosthetic replacement of aortic valve	1) Recurrence 2) Asymptomatic
6	20	Male	Stab wound	Interventricular septal defect	Pericardicentesis	Open suture repair	Asymptomatic

abdomen. Tube thoracostomy and intravenous fluids and whole blood were employed for resuscitation, and two lacerations of the jejunum were repaired at celiotomy. He was discharged from the hospital 15 days later, but returned on October 19, 1956, complaining of precordial pain, easy fatigability, and dyspnea on exertion. The heart was grossly enlarged and a harsh, continuous murmur was heard over the entire precordium, loudest in the third intercostal space just to the left of the sternum. Right heart catheterization demonstrated a left-to-right shunt at the ventricular level with a right ventricular pressure of 26/9 mm. Hg.

Following anatomical diagnosis right ventriculotomy was performed on November 21, 1956, using total cardiopulmonary bypass. A 5 x 15 mm, linear defect was found in the posterior wall of the right ventricular outflow tract communicating with the aorta (Fig. 4) and was repaired with interrupted figure-of-eight sutures. The patient's recovery was uneventful and he was discharged from the hospital on December 3, 1956. Except for an episode of homologous serum hepatitis in February, 1957, he has remained asymptomatic.[1]

Case 2: A 50-year-old man was admitted to the hospital on June 23, 1957, in profound shock shortly

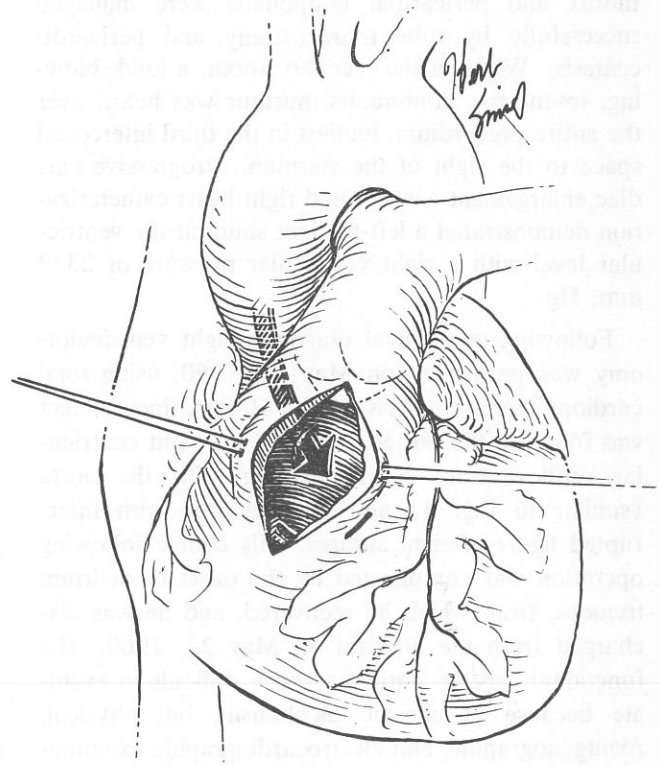

Fig. 4. Drawing illustrating traumatic aortic-right ventricular fistula as seen through right ventriculotomy in Case 1.

after being stabbed twice in the chest. Left hemothorax and pericardial tamponade were managed successfully by whole blood transfusion, tube thoracostomy, and pericardicentesis. While in the recovery room a loud, to-and-fro, continuous murmur was heard over the entire precordium, loudest in the fourth intercostal space to the right of the sternum, and progressive cardiac decompensation subsequently occurred. Right heart catheterization demonstrated a left-to-right shunt at the ventricular level with a right ventricular pressure of 26/7 mm. Hg.

Following anatomical diagnosis right ventriculotomy was performed on August 1, 1957, using total cardiopulmonary bypass. A 5 x 12 mm. defect was found in the posterior wall of the right ventricular outflow tract communicating with the aorta (similar to Fig. 4) and was repaired with interrupted figure-of-eight sutures. The patient's recovery was uneventful and repeat right heart catheterization demonstrated normal hemodynamics. He was discharged from the hospital on September 2, 1957, and was asymptomatic when last seen.[1]

Case 3: A 44-year-old man was admitted to the hospital on March 13, 1960, in profound shock following a stab wound of the chest. Left pneumothorax and pericardial tamponade were managed successfully by tube thoracostomy, and pericardicentesis. While in the recovery room, a loud, blowing, to-and-fro, continuous murmur was heard over the entire precordium, loudest in the third intercostal space to the right of the sternum. Progressive cardiac enlargement ensued, and right heart catheterization demonstrated a left-to-right shunt at the ventricular level with a right ventricular pressure of 23/3 mm. Hg.

Following anatomical diagnosis right ventriculotomy was performed on May 10, 1960, using total cardiopulmonary bypass. A 5 x 10 mm. linear defect was found in the posterior wall of the right ventricular outflow tract communicating with the aorta (similar to Fig. 4) and was repaired with interrupted figure-of-eight sutures. His course following operation was complicated by the onset of delirium tremens, from which he recovered, and he was discharged from the hospital on May 24, 1960. His functional cardiac status has been difficult to evaluate because of chronic alcoholism, but physical, roentgenographic, and electrocardiographic examinations were within normal limits when he was last seen.[1]

Case 4: A 28-year-old man was admitted to the hospital on June 5, 1961, in profound shock shortly after being stabbed twice in the left chest. Left pneumohemothorax and pericardial tamponade were managed successfully by intravenous crystalloid and colloid solutions, tube thoracostomy, and pericardicentesis. While in the recovery room, a loud, harsh, blowing systolic murmur was heard along the left sternal border, loudest in the fourth intercostal space. Progressive cardiac enlargement ensued, and right heart catheterization demonstrated a left-to-right shunt at the ventricular level with a right ventricular pressure of 28/9 mm. Hg.

Following anatomical diagnosis right ventriculotomy was performed on June 30, 1961, using total cardiopulmonary bypass. A 5 x 12 mm. defect was found in the lower portion of the muscular interventricular septum (similar to Fig. 6) and was repaired with interrupted figure-of-eight sutures. The patient's recovery was uneventful. He was discharged from the hospital on July 12, 1961, and has remained asymptomatic.[1]

Case 5: A 39-year-old woman was admitted to the hospital on January 14, 1961, with multiple lacerations and abrasions shortly after an automobile accident in which she had sustained a "steering wheel injury," followed by an episode of syncope. A loud, "cooing", musical diastolic murmur was heard over the entire precordium, loudest in the third left intercostal space adjacent to the sternum with radiation toward the apex of the heart, and signs of aortic valve regurgitation developed. Right heart catheterization revealed normal hemodynamics, and she was discharged on February 2, 1961, to be followed in the clinic. Over the ensuing months she was readmitted to the hospital on several occasions because of shortness of breath, orthopnea, and ankle swelling. Right and left heart catheterizations demonstrated progressive cardiac decompensation, and her condition deteriorated despite conventional cardiac medications.

On November 2, 1961, the aortic valve was exposed using total cardiopulmonary bypass. A tear was found in the intima of the aorta at the attachment of the commissure between the left coronary and the posterior noncoronary cusps of the aortic valve, producing regurgitation by allowing partial prolapse of these cusps (Fig. 5a). Repair was effected by placing sutures through the commissure, area of torn intima, and wall of the aorta, and tying them over baffles on the outside of the aorta (Fig. 5b).

The patient's initial recovery was uneventful except

for a brief episode of upper gastrointestinal tract hemorrhage, but the murmur subsequently recurred and signs of aortic valve regurgitation reappeared. Progressive cardiac decompensation again ensued, and on August 28, 1963, the aortic valve was exposed for the second time using total cardiopulmonary bypass. Recurrence of regurgitation was found to be due to breakage of the sutures previously used for repair, and at this time the leaflets themselves were thickened and their edges somewhat rolled. The major portion of the leaflets was excised and the aortic valve was replaced with an 11A Starr-Edwards ball-valve prosthesis (Fig. 5d). Her recovery was uneventful and she was discharged from the hospital on September 13, 1963. She has resumed caring for her house and her children and has remained asymptomatic.[3]

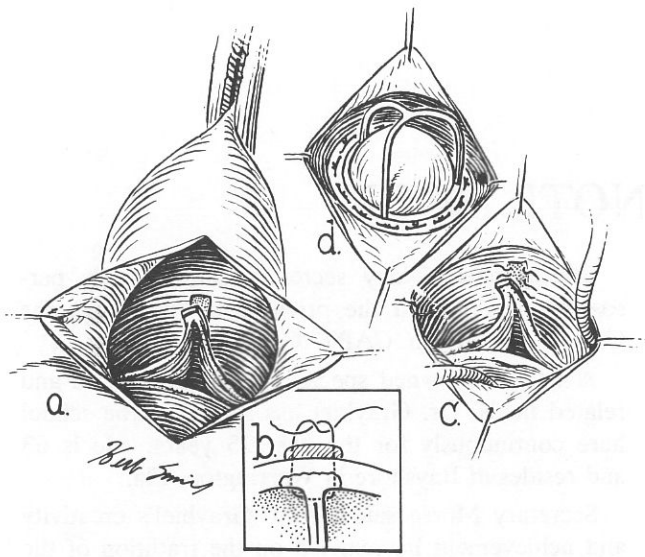

Fig. 5. Drawings illustrating traumatic aortic valve regurgitation as seen in Case 5. (a) Findings at first operation: aortic valve regurgitation due to tear in intima of aorta at attachment of commissure between left coronary and posterior noncoronary cusps allowing prolapse of cusps. (b) Technic of original repair passing sutures through commissure, area of torn intima, and wall of the aorta, tying over baffles on outside of aorta. (c) Findings at second operation: recurrence of regurgitation due to breakage of sutures previously used for repair. Leaflets thickened and edges somewhat rolled. (d) Valve excised and replaced with Starr-Edwards ball-valve prosthesis.

Case 6: A 20-year-old man was admitted to the hospital on March 8, 1964, in mild shock immediately following a stab wound of the left chest. Left pneumothorax and pericardial tamponade were managed successfully by tube thoracostomy and pericardicentesis. Shortly thereafter, a loud, blowing systolic murmur was heard along the left sternal border, loudest in the fourth intercostal space, and a gallop rhythm developed. Cardiac decompensation ensued but responded to digitalis therapy, and right heart catheterization demonstrated a left-to-right shunt at the ventricular level with a right ventricular pressure of 30/4 mm. Hg.

Following anatomical diagnosis right ventriculotomy was performed on March 19, 1964, using total cardiopulmonary bypass. A 15 mm. defect was found in the midportion of the muscular interventricular septum (Fig. 6) and was repaired with interrupted figure-of-eight sutures. The patient's recovery following operation was uneventful. He was discharged from the hospital on March 28, 1964, and has remained asymptomatic.

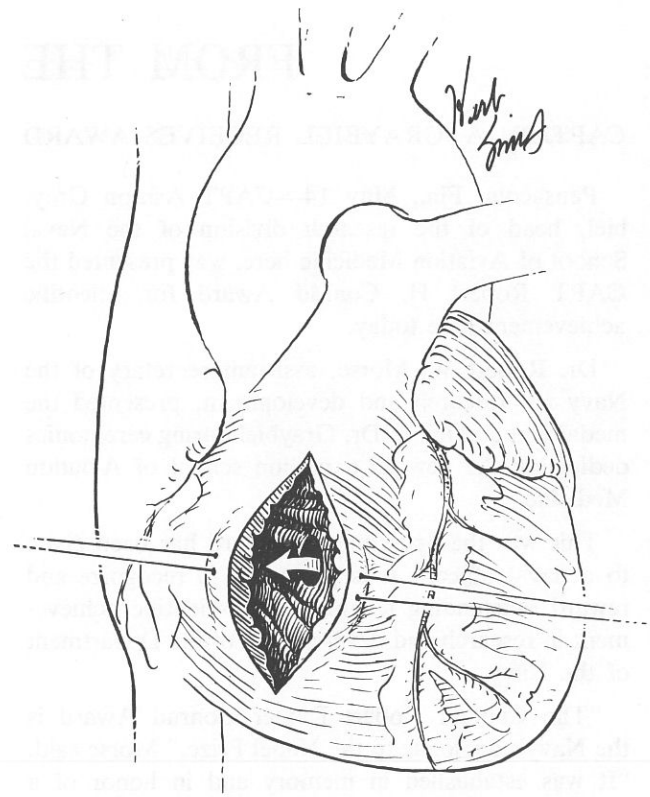

Fig. 6. Drawing illustrating traumatic interventricular septal defect as seen through right ventriculotomy in Case 6.

SUMMARY

Experience with a large number of cardiac injuries treated in the city-county charity hospitals of Houston and Harris County, Texas, has allowed development of certain principles of management. These include accurate evaluation, replacement of blood loss, and restoration of normal pulmonary function. Pericardial tamponade is treated primarily by pericardicentesis, reserving cardiorrhaphy for those patients who do not respond to pericardial aspiration or whose condition again deteriorates following pericardicentesis.

Among these patients with cardiac injury have been six with hemodynamically-significant intracardiac injuries which could not have been managed primarily, even if immediate thoracotomy had been elected or necessary. Following recovery from the initial episode associated with wounding, an accurate anatomical diagnosis was made in each patient, which then allowed successful repair in all instances using total cardiopulmonary bypass. It would appear from this experience that recognition of such lesions now is of more than academic interest.

References

1. Beall, A. C., Jr., Morris, G. C., Jr. and Cooley, D. A. Temporary cardiopulmonary bypass in the management of penetrating wounds of the heart. Surgery, 52: 330-337, 1962.
2. Beall, A. C., Jr., Ochsner, J. L., Morris, G. C., Jr., Cooley, D A. and DeBakey, M. E. Penetrating wounds of the heart. J. Trauma, 1:195-207, 1961.
3. Beall, A. C., Jr. and Shirkey, A. L. Successful surgical correction of traumatic aortic valve regurgitation. JAMA, 187: 507-510, 1964.
4. Beall, A. C., Jr., Shirkey, A. L. and DeBakey, M. E. Surgical management of cardiovascular trauma. J. Cardiov Surg. In press.
5. Cooley, D. A., Beall, A. C., Jr. and Grondin, P. Open heart operations with disposable oxygenators, 5 per cent dextrose prime and normothermia. Surgery, 52: 713-719, 1962.
6. DeBakey, M. E., Beall, A. C., Jr. and Wukasch, D. C. Recent developments in vascular surgery with particular reference to orthopaedics. Amer J Surg. In press.
7. Parmley, L. F., Manion, W. C. and Mattingly, T. W. Nonpenetrating traumatic injury of heart. Circulation, 18: 371-396, 1958.
8. Rehn, L. Ueber penetrirende Herzuden und Herznaht. Arch Klin Chir, 55: 315-329, 1897.

FROM THE NOTE BOOK

CAPTAIN A. GRAYBIEL RECEIVES AWARD

Pensacola, Fla., May 14—CAPT Ashton Graybiel, head of the research division of the Naval School of Aviation Medicine here, was presented the CAPT Robert H. Conrad Award for scientific achievement here today.

Dr. Robert W. Morse, assistant secretary of the Navy for research and development, presented the medal and citation to Dr. Graybiel during ceremonies dedicating the new $2.6 million school of Aviation Medicine.

This was the first time this award has been given to a naval officer. It is presented to recognize and reward outstanding technical and scientific achievement in research and development of the Department of the Navy.

"The Captain Robert Dexter Conrad Award is the Navy's analogue to the Nobel Prize," Morse said. "It was established in memory and in honor of a scientist in uniform whose foresight and sensitivity helped the Navy assume a role of major national leadership in supporting basic research among the nation's universities and other research institutions," he said.

The assistant Navy secretary said he was personally delighted in the privilege of presenting the Conrad Award to CAPT Graybiel.

A world renowned specialist in aeromedicine and related fields, Dr. Graybiel has served at the school here continuously for the past 23 years. He is 63 and resides at Bayshore in Warrington, Fla.

Secretary Morse said CAPT Graybiel's creativity and achievement has carried on the tradition of the man for whom the award is named.

"Unlike other Navy awards," the secretary continued, "the CAPT Conrad Award for Scientific Achievement is open to civilian scientists, to military scientists and also to scientists engaged in research under contract with the Navy."

Dr. Morse noted that "this is the first time this award has been given to a naval officer on the basis of his preeminence as a research scientist."

In lauding Dr. Graybiel's contributions to aeromedicine and related fields, the Navy secretary said, "he has been able to devote practically his full naval career to creative research is less known and deserves greater public appreciation. His career is a landmark of encouragement for other naval officers whose creative talents in research might also be given the

same opportunity for full expression within the naval environment."

Speaking both as a scientific member of the national community and as a spokesman for the Secretary of the Navy, Dr. Morse said he was presenting this award to Dr. Graybiel "as a simple token of our great esteem for your brilliant career as a scientist and naval officer."

A native of Port Huron, Mich., CAPT Graybiel is a graduate of the University of Southern California and the Harvard Medical School.

In addition to being one of the nation's top aviation medicine specialists, Dr. Graybiel is also widely known as a research physician and cardiologist.

He is married to the former Moria Berkley Martin. They have two children, a daughter, Ann, and a son, Ashton.—Public Information Office, NAS Pensacola, Fla.

INFANT SAVED

U. S. Naval Station, Roosevelt Roads, P. R.—Professional competence and quick work on the part of the Roosevelt Roads medical team saved the life of Denise Rene McMurray recently.

Denise was born almost three months premature on Dec. 17, 1964 at the Station Hospital and weighed only 2 pounds 3 ounces. Doctors and nurses worked 'round the clock' to keep the infant alive. The child received the finest medical care and attention available anywhere.

After spending three months in an incubator, Denise left the hospital in the arms of her parents Aoan and Mrs. Donald McMurray III Monday March 15, reportedly in fine health.

Lieutenant Commander Robert Rack, MC pediatrician, explained that Denise's development should be normal from now on.

U.S. NAVAL STATION, ROOSEVELT ROADS, P. R.—Denise Rene McMurray (center), who at birth, Dec. 17, 1964, weighed only 2 pounds 3 ounces, received an abundance of special attention from the Roosevelt Roads medical team in a successful effort to save her life. Shown with Denise are her parents Aoan and Mrs. Donald McMurray III, and members of the medical staff: (front) Mickey Joplin, HN; the parents and child; and Howard Peters, HN3. (Back row) Dr. Richard Sharpe, LCDR MC; LT Joan E. Matera, NC; Dr. Robert Rack, LCDR MC; and LCDR Natalie T. Sampson, NC. (U.S. Navy Photo by Renaud, PH2)

BLOOD RECRUITMENT POSTER

One hundred fifty copies of the above poster are boosting blood recruitment at Oakland Naval Hospital's Blood Bank.

They are on display at all naval installations in the San Francisco Bay Area including ships in port.

HM3 Fred Fisher, Oak Knoll laboratory technician-artist, created the poster on his own time after ENS N. M. Hirsch, MSC, medical technologist in charge of the hospital's blood donor center, conceived the idea for it. The finished product is a 17 x 22-inch lithographed poster in red and black on white poster board.

LT K. L. Darr, MSC, hospital contact for blood donors at Naval Air Station, Alameda, and HMC R. L. Falls, who obtains donors from U.S. Naval Station, Treasure Island, have found the poster an aid in blood recruitment.

ACKNOWLEDGMENT

In the U.S. Navy Medical News Letter Vol. 45(8):1, after "Frank C. Spencer, M.D." add "Professor of Surgery, University of Kentucky."

HEROIC NAVY NURSE HAILED BY HOMETOWN

Dover, N. H.—LT (jg) Ann Darby Reynolds, Navy Nurse, who received the Purple Heart for wounds suffered in the bombing of a Saigon Hotel while on duty with the Navy Headquarters Support Activities, has been given the key to the city of Dover, N. H., her hometown.

Miss Reynolds also earned two letters of appreciation while on duty in Vietnam. The first was for her assistance to the wounded when the USS Card was damaged by an explosion, and her second for her care to the wounded at an Army field hospital. —(Navy Times, 14:(29), May 5, 1965.)

CORRESPONDENCE COURSES

MANUAL OF THE MEDICAL DEPARTMENT AND COMBAT AND FIELD MEDICINE PRACTICE

"The recently revised Medical Department correspondence courses "Manual of the Medical Department, Parts I, II and III" (NavPers 10708–A,

10709–A, and 10905, respectively) and "Combat and Field Medicine Practice" (NavPers 10706–A1) are now available for distribution. These courses are intended for both officer and enlisted personnel of the Armed Forces. Applications should be submitted on NavPers Form 992 (with appropriate changes in the "To" line) to the Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014.

"The Manual of the Medical Department courses are designed to familiarize personnel of the U. S. Navy Medical Department with organization, administration and management of U. S. Navy facilities and activities controlled by the Bureau of Medicine and Surgery. Completion of the fifteen (15) assignments will provide an insight into the significant functions of the Medical Department pertinent to the U. S. Navy and Marine Corps."

"Naval Reserve retirement and/or promotion points will be credited for satisfactory completion as follows:

Manual of the Medical Department

	Assigns.	Points
Part I (NavPers 10708–A)	4	6
Part II (NavPers 10709–A)	5	8
Part III (NavPers 10905)	6	9

"It is emphasized that the course has been completely revised. Personnel who have completed the previous courses (NavPers 10708–2 and 10709–2) will receive credit for completing the revised courses.

"Combat and Field Medicine Practice" (NavPers 10706–A1) is designed for the use of Medical and Dental personnel as a guide to help solve problems that could occur during all phases of amphibious operations, particularly those of preventive medicine, first aid in the field, transportation of the injured, surgical and medical treatment, evacuation and administrative procedures during combat, in all types of weather, climate and terrain.

"The course consists of five (5) assignments and carries Naval Reserve promotion and retirement credit of ten (10) points. This is a minor revision and personnel who have completed NavPers 10706–A will *NOT* receive additional credit for completing this course."—Training Division, BUMED.

PREMIERE OF BUMED FILM "NURSE CORPS, USN" AT AMERICAN NURSES' ASSOCIATION CONVENTION SAN FRANCISCO, CALIFORNIA

A professional exhibit featuring the new BUMED color film, "Nurse Corps, USN" was displayed from 26-30 April, 1965 at the biennial convention of the American Nurses' Association, San Francisco, California.

The BUMED exhibit was highlighted by the skillful portrayal of a Navy Nurse Corps theatre featuring the premiere of "Nurse Corps, USN." Large groups of nurses and nursing students attended the premiere and were enthusiastic in their reception to the film.

The 16 mm film was produced for BUMED by MPO studios, New York, New York. The film depicts a portrayal of Lieutenant (junior grade) June Bond's experiences during her first tour of duty. She recalls her activities from the time of her commissioning and indoctrination to her current assignment in an intensive care unit. Her professional duties in nursing, administration and teaching as well as her social and recreational activities are portrayed as a "Navy way of life" and the "family in the Navy" of which she is a vital member. The film ends with a projection of the professional and personal opportunities that lie ahead.

Copies of the film have been forwarded to Nurse Programs officers assigned to Navy Recruiting Stations and to naval hospitals and medical activities. Arrangements have been made to feature the film on television outlets throughout the nation during the month of June.—Nursing Division, BUMED.

NAVY NURSE CORPS ANNIVERSARY BREAKFAST

An anniversary Navy Nurse Corps breakfast at the Hilton Hotel, San Francisco, on 28 May was attended by 125 members and former members of the Corps. All expressed pleasure in renewing friendships with retired members and meeting former members who had served in the Corps. Members of DACOWITS attending included Mrs. Lulu Hassenplug, Dean, School of Nursing, University of California; Mrs. Agnes O'Brien Smith, Deputy City Attorney, San Francisco; and Dr. Marcia A. Dake, Dean, College of Nursing, University of Kentucky. The Consultant to the Surgeon General, Mrs. Marie Andrews, Associate Professor, Boston College, was an additional honored guest. Captain Erickson extended greetings and congratulations to the nurses and spoke to them of significant milestones of the Nurse Corps' history. She also discussed current ongoing projects and programs. Captain Erickson concluded her address by presenting members of the group who served during World War II and nurses who had retired. These nurses received a standing ovation.—Nursing Division, BUMED.

DENTAL SECTION

ACQUIRED DENTAL DEFECTS AND SALIVARY GLAND LESIONS AFTER IRRADIATION FOR CARCINOMA

R. H. Frank; J. Herdley; E. Phillippe; JADA 70(4): 868–883, April 1965.

A systematic study was undertaken of the dental defects, the saliva and the histopathologic alterations found in the salivary glands of patients who had been irradiated for cancers in the oral and pharyngeal regions.

A careful examination of the oral cavity determined each patient's dental condition and the condition of the oral mucous membranes. It was noted whether the teeth were inside or out of the field of irradiation. Sixty-one teeth with dental defects were examined on decalcified and ground sections by routine optical microscopy and in polarized light. Twenty of these teeth were located inside the radiated field. Extractions were performed under local anesthesia with careful antibiotic medication. There was no development of osteoradionecrosis, confirming the observations of Wildermuth and Cantril.

Pooled saliva specimens were collected and a histologic study was made of salivary glands secured from radial neck dissections.

The authors reported that:

1) Diffuse superficial dental defects (carious lesions) developed after radiation therapy only when the salivary glands were in the field of radiation.

2) When similar doses of radiation therapy were given directly to the jaws and teeth, but not to the salivary glands, such dental lesions did not develop, even after three years of cobalt teletherapy.

3) The tooth surfaces involved by these dental defects were found to be in those areas normally cleansed by saliva; eg. buccal, palatal, lingual, smooth occlusal or incisal surfaces. The interproximal areas and occlusal fissures were least involved. Histologically these defects were similar to dental caries.

4) Drastic changes in the saliva were reported such as:

(a) decreased volume

(b) increased viscosity and acid pH

(c) marked increases in organic matter.

Therefore, the dental surfaces normally protected by the flow of saliva were no longer submitted to its protective actions. On the contrary, the tooth surfaces were covered by a sticky, sloughy material which provided an excellent substrate for bacterial attack.

The salivary alterations were felt to be related directly to the important pathologic changes induced in the salivary glands by the radiation therapy. These changes developed progressively for several months after irradiation, resulting in pronounced glandular atrophy.

Regarding the relationship of oral surgery and exodontic procedures in irradiated mouths, the authors observed the following:

1) If the salivary glands had not been irradiated (even though the jaws and teeth had been) dental defects would not develop and therefore they felt it unnecessary to extract healthy teeth as preventive measures.

2) If the salivary glands had been irradiated, but the teeth and alveolar bone were outside the field of irradiation, dental defects did develop. However, since the dental and contiguous osseous areas were not in the field of radiation, they felt it "perfectly possible" to extract these teeth. In all patients who underwent extractions under these conditions, healing progressed normally, without the development of osteoradionecrosis or other complications.

3) In patients whose salivary glands, teeth and jaws were in the field of radiation, bone vascularity was compromised. However, local anesthetics without vasoconstrictors and careful antibiotic coverage safely protected the patients from surgical complications and the development of osteoradionecrosis.

The authors conclude that there is more than a casual relationship between acquired dental defects after irradiation and the alterations of the salivary glands and the secretion of saliva. They feel a reappraisal of the present concepts concerning exodontia in patients who are to receive radiation therapy is indicated, and that further research is

needed to elucidate the properties of the viscid salivary secretions which occur as a result of glandular radiation.

(Submitted by: Capt. S. Hoffman DC USN, U. S. Naval Training Center, Great Lakes, Illinois).

Editor's Note:

This article is of particular interest as it is closely related to another abstract, "Current Oral Surgical Opinion Concerning the Value of Pre-Irradiation Exodontia," published in the previous issue of the U. S. Navy Medical News Letter.

Capt. Hoffman, who submitted both articles, was recently elevated to Fellowship in the American Academy of Oral Pathology.

ULTRASONIC PROPHYLAXIS IN A NAVAL VESSEL

LT S. V. Holroyd, DC USN and Capt D. L. Firestone, DC USN, in USS TIDEWATER (AD–31), have submitted a final report titled, "The Evaluation of the Densply Cavitron Ultrasonic Prophylaxis Unit in a Naval Vessel," under research task MR 005.12–5221. In development of this study, BuMed approved installation of the ultrasonic unit in a ship subject to the following stipulations: "The Cavitron Dental Unit may be used aboard ship without special shielding, provided it is located in areas which are enclosed by steel bulkheads through which no sensitive cables (such as communications and sonar-receiving cables) pass"; and "The Cavitron Dental Unit must be located at least ten (10) feet from radio receivers and any other frequency sensitive lead-in cables." Having complied with these requirements, USS TIDEWATER experienced no problems of electronic compatibility.

The Cavitron Unit was provided on a loan basis for user test, by the Densply Corporation. The Unit was strapped into a bulkhead-mounted angle iron frame, convenient to the dental operating chair. The manufacturer's maintenance instructions were followed. In approximately ten months' use, including a cruise from Norfolk to the Mediterranean, no problems, malfunctions, or disadvantages were observed.

Three technicians, DT2, DT3, and DA, were trained in Cavitron prophylaxis by one week of instruction, followed by two weeks of closely supervised clinical use. This training proved adequate.

In 244 "light" calculus cases and 200 "moderate-to-heavy" calculus cases, a half-mouth cavitron and a half-mouth conventional prophylaxis were performed. Cavitron prophylaxis took 35% less time ($P<.001$). Conventional prophylaxis was superior in stain removal ($P<.001$); but both methods were satisfactory. In the "light" calculus cases, calculus removal was comparable for the two technics; but in the "moderate-heavy" calculus cases, the Cavitron was superior ($P<.002$).

Although only slight soft tissue injuries were obtained with either method, the Cavitron caused less in "moderate-heavy" cases ($P<.03$). No difference was seen in 24-hour tooth sensitivities. Both patients and technicians showed a strong preference for Cavitron prophylaxis.

Editor's Note: The interested reader's attention is also called to the U. S. Navy Medical News Letter 44(12):12, 1964 and 45(4):12, 1965.

WASHINGTON'S MISSING DENTURES: SOLVING THE MYSTERY

B. W. Weinberger, JADA 60(4): 542–546, April 1960.

The now-you-see-them, now-you-don't appearance of dentures supposed to have been worn by George Washington through the ages has generated an aura of mystery regarding these artifacts. The writer, author of the volumes, An Introduction to the History of Dentistry in America, offers an explanation of why these historical displays have suddenly disappeared a number of times in the past.

This article reveals several interesting facts about Washington's dentures during the last ten years of his life. He wore at least five different sets of dentures, most of which were hand carved from hippopotamus ivory. Revealed too, is the myth that Paul Revere had constructed a wooden denture for the first President.

The set of dentures presently exhibited at Mount Vernon are made of lead using elk's teeth. They weigh over two pounds and were constructed for the sole purpose of posing Washington for a portrait.

TREATMENT PLANNING PRINCIPLES

H. D. Millard, J Mich DA 46: 301–305, Nov. 1964.

Principles of treatment planning aid in determining the correct choice of treatment, where a choice exists, and aid in the organization of a plan of treatment in a logical sequence.

The major principles for planning treatment are:

1. The plan must be based on accurate diagnosis.

2. The patient's chief complaint must be a primary consideration.

3. Past and present systemic disease must be considered.

4. Influence of the personal and social history of the patient must be considered.

5. The effect of past dental experiences on the present condition of the mouth must be evaluated.

6. The sequence of treatment must be planned.

A complete dental and medical history, clinical examination, roentgenographic survey and use of laboratory and other diagnostic aids are the basis for making a diagnosis. With a complete list of the oral defects which require treatment, it is possible to plan the various types of dental treatment in a logical sequence. In most instances, other than routine periodic visits, a chief complaint motivates a patient to seek dental care. The dentist should provide temporary or permanent relief of the chief complaint before proposing any extensive diagnostic procedures and treatment. Prompt, effective care of a chief complaint often builds excellent rapport between the dentist and his patient.

An appreciation for the sequelae of past systemic disease and the implication of existing systemic disease is essential to correct dental treatment.

Every dental treatment plan should include teaching the patient methods of oral hygiene which best meet his individual needs. The economic status of the patient is important in planning dental treatment, as is his occupation or career.

The patient's current oral status reflects the past rate and progress of caries and periodontal disease.

If each phase of treatment is rendered in proper sequence, optimum results will be attained.

Errors in planning the sequence of dental treatment can be avoided if treatment is provided in the following order: systemic, preparatory, corrective and maintenance.

PERSONNEL AND PROFESSIONAL NOTES

Dental Office Presentations. CAPT. D. E. Cooksey, DC USN, Commanding Officer, U. S. Naval Dental Clinic, Yokosuka, Japan, presented two essays before the 57th Annual Meeting of the Philippine Dental Association 26-30 May 1965, in Quezon City, P. I.

CAPT G. H. Rovelstad, DC USN, U. S. Naval Dental School, Bethesda; Maryland, was Moderator for the Scientific Section of Fluid Environment of the Teeth, sponsored by the Third International Conference on Oral Biology, before the Royal College of Surgeons 14-16 June 1965, in London, England.

CDR. R. J. Leupold, DC USN, U. S. Naval Dental School, Bethesda, Maryland, presented a table clinic entitled "Gold Pin Inlays," before the Maryland State Dental Association, on 5 May 1965, in Baltimore, Maryland.

CAPT. R. H. Friesz, DC USN, Executive Officer, U. S. Naval Dental Clinic, Brooklyn, New York, presented an illustrated table clinic entitled, "Mouth Lesions" before the 97th Annual Meeting of the Dental Society of the State of New York, on 5 May 1965, in New York City.

LCDR H. J. Keene, DC USN, U. S. Naval Training Center, Great Lakes, Illinois, presented an essay entitled, "Perinatal Factors Associated with Dental Anomalies in Caries—Resistant Naval Recruits," before a Dental Anthropology class, University of Chicago, on 27 April 1965, in Chicago, Illinois.

CAPT G. L. Parke, DC USN, NINTH Naval District Dental Officer, and CAPT M. G. Turner, DC USN, Dental Officer, U. S. Naval Training Center, Great Lakes, Illinois, hosted eighty-two members and guests from the Chicago and Milwaukee Chapters of the IADR, on 22 April 1965. The guest speaker, Doctor R. P. Mariella, Head of the Department of Chemistry, Loyola University, presented a lecture entitled, "The Future of Science Education." Doctor I. L. Shklair, President of the Chicago Chapter, IADR, is Chief, Microbiologist Naval Research Facility, USNTC, Great Lakes, Illinois.

CAPT R. L. Combs, Jr., DC USN, Dental Officer, Headquarters Support Activity, Taipei, Republic of China, recently announced that LT R. S. DeWaters, DC USNR, presented an essay entitled "Anesthetic Complications and Dental Office Emergencies," before the American Stomatological Society of Japan, 10-11 May 1965, at Camp Zama, Japan. LT J. F. Debs, DC USN, presented an essay entitled, "Periodontics," before the Philippine Dental Association, 26-30 May 1965, in Quezon City.

As a result of the COMNAVPHIL inspection of HQ Support Activity, Taipei, in November 1964, the Dental Department was the only department to receive a grade of OUTSTANDING. This is the

third year in succession that the Dental Department has received this grade.

CAPT R. A. Middleton, DC USN, Chief of Dental Service, U. S. Naval Hospital, Oakland, California, presented a lecture entitled, "Inflammatory Disease of Salivary Glands," before members of a post-graduate course in Oral Surgery, at Letterman General Hospital, on 9 April 1965, in San Francisco, California.

Dental Service staff members and interns of U. S. Naval Hospital, Oakland, California, presented the following table clinics before the 95th Annual California Dental Association Meeting, on 27 April 1965, in San Francisco, California:

CLINICIANS	*PRESENTATIONS*
LCDR B. C. Terry, DC USN	"Injection Obturation In Surgical Endodontics"
LCDR J. F. Hardin, DC USN	Mucogingival Surgery
LT. R. W. Brazil, DC USN and LT M. T. Jupina, DC USN	Alloy Equilibration and Finishing
LT J. M. Cahan, DC USN	Surgical Flap Design
LT J. M. Allen, DC USN and LT K. G. Ponder, DC USN	Resilient Denture Bases
LT B. E. Sharrow, DC USN	Sutures and Suturing
LT D. S. Prock, DC USN and LT R. L. Seberg, DC USN	Combined Therapy in Treatment of Teeth With Furcation Involvement

CAPT S. E. Tande, DC USN, U. S. Naval Dental School, Bethesda, Maryland, presented a demonstration entitled, "Production Techniques in Pre-clinical Dentistry," before the 7th Annual Meeting of the Council on Medical Television jointly sponsored by the University of Michigan Medical School and Extension Service 17-19 May 1965, in Ann Arbor, Michigan. CAPT Tande is Head, Audiovisual Education Department, U. S. Naval Dental School, Bethesda, Maryland.

CAPT T. C. Pablos, DC USN, U. S. Marine Corps Recruit Depot, San Diego, California presented the following illustrated lectures:

"Endodontic Considerations in Relation to the Bar Joint Fixed Partial Denture," before the San Diego Endodontic Seminar on 25 March 1965 and "The Bar Joint Fixed Partial Denture", before the Paul Revere Dental Study Club of San Diego on 3 May 1965.

Distribution of Dental Forms and Publications. The Dental Division has recently received an ususual volume of misdirected requests for various forms and publications. The following information should be brought to the attention of administrative personnel:

DENTAL ADMINISTRATION, NAVPERS 10483 is the *text* for Dental Correspondence Course, NAVPERS 10736–B. It supersedes *three* publications: DENTAL DEPARTMENT ADMINISTRATION, NAVPERS 10790A; DENTAL CLINIC ADMINISTRATION, NAVPERS 10789; and FISCAL AND PROPERTY MANAGEMENT IN DENTAL FACILITIES, NAVPERS 10840.

One copy of DENTAL ADMINISTRATION was mailed to each dental activity for official use, *additional copies* are NOT AVAILABLE. This would indicate that an accountability should be maintained to avoid loss of the official copy.

BUMED NOTICE 6600 of 26 June 1964 indicated that additional copies of INDIVIDUAL DENTAL OFFICER—DAILY DENTAL SERVICE RECORD, NAVMED–1456 may be obtained by letter request addressed to BUMED Code 6113. Stock-piling of these forms is to be discouraged.

AVIATION MEDICINE SECTION

PROMOTION OF FLIGHT SAFETY RECOGNIZED

Norfolk—A Norfolk-based Navy captain has been presented the Harry G. Moseley Award by the Aerospace Medical Association for having made the "most outstanding contribution to flight safety" during the past year.

CAPT Richard E. Luehrs, who heads the Aeromedical Department at the Naval Aviation Safety Center, was presented the award at the annual scientific meeting of the association in New York.

More than 2,500 national and international physicians and scientists attended the four days of scientific presentations.

The Moseley Award was established by the Republic Aviation Corporation in memory of Colonel Moseley's contributions to flight safety.

Luehrs has distinguished himself in aviation safety throughout his entire Navy medical career.

A graduate in medicine from the University of Oregon Medical School in 1946 and designated a naval flight surgeon in 1948 upon graduation from the U.S. Naval School of Aviation Medicine, he has served aboard 10 aircraft carriers.

While serving as an instructor in aviation physiology at the school of aviation medicine, he developed and organized—for the first time at this school—courses in aviation safety, aircraft accident investigation and operational aviation medicine for student flight surgeons.

He developed the first "aviation crash investigation site" to provide practical, on-the-scene accident training, and also developed a portable aircraft accident investigation truck.

Serving as a research assistant in the use of oxygen and other emergency equipment, he investigated electroencephalography as an objective means of discovering potential accident victims.

Recently he has directed the medical group associated with Army, Navy and Air Force aviation safety centers in establishing common definitions, terminology and coding information providing a broad base for information available to all three services.

Luehrs is a diplomate in Aviation Medicine of the American Board of Preventive (and of the American College of Preventive) Medicine, and is a fellow of the Aerospace Medical Association.
—Aviation Medicine Section, BUMED.

AVIATION MEDICAL ACCELERATION LABORATORY NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE, PENNSYLVANIA

It is considered that a description and accomplishment report relating to the Aviation Medical Acceleration Laboratory will be of value in establishing broad-spectrum understanding regarding the support to Navy operations as well as the value to other military departments and the National Aeronautics and Space Administration.

The Aviation Medical Acceleration Laboratory is situated in four buildings with a total floor space of 37,693 square feet. A circular building, 130 feet in diameter and three floors high, houses the human centrifuge, the animal centrifuge with an eight-foot arm, the research laboratory spaces, administrative offices, shop spaces, professional library and an auditorium. A wing is being added which will provide 2,400 square feet additional floor space. The anticipated completion date of this wing is 23 April 1965.

As indicated above, a human centrifuge is housed in the main building. This dynamic flight simulator has both a closed and open loop computer capability. The centrifuge is driven by a 4,000 hp motor and consists of a 50-foot arm with a 10-foot diameter gondola capable of holding three subjects. The three-gimbal system of the gondola, under computer control, allows great versatility in the projection of "G" forces on the subject or equipment tested. A maximum of 40 "G"s, 360-degree pitch, and yaw and roll axes are possible.

The Director of the Aviation Medical Acceleration Laboratory is CAPT E. M. Wurzel, MC USN who is assisted by 5 Navy Medical Corps and Navy Medical Service Corps officers and 7 enlisted men.

There are sixty-five civilians aboard, including 10 Ph.D.'s and 7 M.D.'s.

The Aviation Medicine Division of the Laboratory continues its basic functions of medical monitoring, collaborative support of other research divisions, and initiating and prosecuting its own research projects. Basic work on blood oxygen mechanisms is being conducted and reported. Other areas have included anti-"G" suit evaluation and medical support of the National Aeronautics and Space Administration Gemini programs.

During the past year the Physiology Division has developed an FM-FM biotelemetry system which transmits physiological data from the subject's person. In addition, this Division has been engaged in fundamental work involving oxygen toxicity in animals, as well as studying mechanisms of reaction of heat regulatory centers in animals.

The Biophysics and Bioastronautics Division continues to conduct research in acceleration protective devices. The efficiency of the inherently fire resistant polyamide fiber "Nomex" in fire protective gear was firmly established by the Thermal Branch of this Division. A patent has been awarded on the flame contact heat analyzer apparatus developed from this work.

The Biochemistry Division is involved in the control of biological energy via neurohormonal regulation. A free radical was found generated in both nerve and brain by a mechanism known to trigger nerve impulses in-vivo. These, together with other biochemical studies at the cellular level, are considered important in that they offer some understanding of the mechanisms for energy transformations from oxygen uptake reactions in stress states.

During the past year the Psychology Division prepared the written sections of the Navy-Manned Orbital Laboratory Documentation on human factors, test, and evaluation of astronaut training, performance analysis, and simulation. In its Biomechanics Branch, a preliminary program was completed to determine the usefulness of powered exoskeletal systems in increasing human tolerance and performance capabilities in high acceleration environments. In the Human Factors Branch, data collection was completed upon a controlled study of man's ability to orient with respect to the gravitational vertical. Water immersion was utilized to provide equilateral support of the subject while positioned upon a tilt table. The second Gemini centrifuge simulation program has been completed. This program provided training for the primary and backup crews for Gemini GT III and GT IV. The efforts of the Vision Branch has been devoted to the problem of flashblindness from special weapons and related problems. A laboratory study has been conducted on the relation of flight adaptation and pupil size to recovery time from flashblindness.—Aviation Medicine Section, BUMED.

AVIATORS ARE A-OK! CONFINEMENT STUDY A MAJOR SUCCESS

Naval Air Engineering Center, Air Scoop 13(7):1, April 23, 1965.

A substantial contribution to the manned space flight program was accomplished at the Naval Air Engineering Center Aerospace Crew Equipment Laboratory on Monday, April 19, when eight Navy and Marine Corps aviators emerged from 34 days of living in two sealed space chambers.

Dirty and wearing 34-day beards, the eight came out of their imaginary space ships wearing full pressure suits.

Since the test began on March 16 the men had not bathed or shaved. All they could do to keep clean was to wipe their faces with a damp cloth and brush their teeth with dry toothbrushes.

The six who came out of the larger cylindrical chamber were Ltjg James B. Abbitt, USN, of Naval Air Station, LeMoore, California; Captain Karl A. Foster, USMC, of Margate City, New Jersey; Ltjg William R. McBride, USNR, of Chadron, Ohio; Ltjg Jerry W. Munger, USN, of Greendale, Wisconsin; Ltjg Cyrus W. Strickler, III, USN, of Atlanta, Georgia; and 1/Lt. Carl H. Yung, USMC, of Cincinnati, Ohio.

Emerging from the "cottage", a box measuring 12-ftx12ftx18-ft, were Lt Kenneth C. Juergens, USN, Cincinnati, Ohio; and Ltjg Richard M. Pipkin, USNR, of McGuire Air Force Base, New Jersey.

The first group of six left their capsule at 7:11 a.m. The second group came out about 7:30 a.m.

All appeared in good health and humor, and joked about their "king sized five o'clock shadows". They had neither shaved nor bathed for 34 days.

One of them wanted to know if it was raining outside and was told it was pouring.

Lt Juergens and Lt Pipkin emerged from their "cottage" smiling and shaking hands with Cdr Kenneth R. Coburn, MSC USN, Project Manager of the 34-day confinement study.

"Feeling okay?" asked Coburn.

"Fine," replied Juergens.

The eight men performed various tasks during their stay in the chambers. They were under close scrutiny, ate specially prepared food, listened to the radio, watched television—and got on each other's nerves.

During 20 of the 34 days, the group of six in the cylindrical Bioastronautical Test Facility was given only pure oxygen to breathe at a pressure simulating conditions 27,000 feet above sea level.

This was one of the most dangerous phases of the experiment because there were constant possibilities of devastating fire.

The project sponsored by the National Aeronautics and Space Administration (NASA), was designed to collect and analyze a mass of data about the physical effects upon space crewmen of prolonged stays in a low pressure but pure oxygen breathing atmosphere.

The other phase was to examine the physiological factors of close confinement during multi-manned space flight missions, requiring many days of continuous orbital or deep space flights.

The eight were selected from a small but nationwide pool of potential Navy and Marine Corps astronaut candidates.

All eight passed rigid physical and psychological tests demanded by the project. They received intensive training at the NAEC for two weeks before they entered the chambers on March 16.

For all practical purposes, the six in the steel chamber became an infinitely confined "space crew" committed to a simulated space flight mission.

During the first seven days they lived under normal atmospheric conditions. They breathed an atmosphere containing 20 percent oxygen at a pressure of 14.7 pounds per square inch—the pressure at sea level.

On the eighth day the chamber was pumped out to an "altitude" of 27,000 feet above sea-level and pure oxygen substituted for the air. At the same time, the total gas pressure was dropped to only five pounds per square inch, all of which represents the breathing atmosphere conditions currently accepted by NASA for space vehicle requirements.

The six lived under these conditions for 20 consecutive days. The chamber was restored to sea-level air breathing environment during the final seven days of the study.

Lt Juergens and Ltjg Pipkin, lived in their capsule in a normal sea-level type atmosphere at all times. They did the same type tasks as did the group of six.

They were the "control crew". Lt Juergens and Ltjg Pipkin were the test subjects upon whom the greatest emotional stress was placed.

The entire experiment depended on a comparison of the behavioral patterns between the two groups.

Their experience may provide badly wanted answers to the critical question of whether or not only two crewmen can live harmoniously together under prolonged space mission confinement conditions.

There is no detectible difference between air at sea level or pure oxygen at 27,000 feet as far as the subject is concerned, but there is considerable difference between living conditions among six confined crewmen as compared to only two with respect to monotony and emotional stability required to survive it.

A formidable mass of experimental tests and observations were made on all eight subjects. An organized team of more than 50 specialists, including physiologists, flight surgeons, psychologists, bacteriologists, engineers and skilled technicians, both Navy and civilian, gathered mounds of data and managed the complex operation according to a typical Navy task force approach.

These efforts were carried out on a round-the-clock basis. All volunteers were kept under continuous surveillance via closed circuit television, as well as by direct vision if required for their safety. In fact, they were kept under close scrutiny at all times.

An important aim was to determine the ability of a space crew to live continually in an at least partially donned space suit for many days.

Sudden failure of the normal protection in a space ship would require an astronaut to seal himself in a space suit if he was to survive.

All eight men wore full pressure suits for three weeks, and parts of suits during the rest of the time.

Each subject had a busy but closely regulated schedule of activities to follow daily. Meals were taken four times daily from compact NASA-provided space rations which were specially prepared by the men themselves.

Calories (2500 daily) were precisely counted. Personal hygiene practices were strictly tailored to space mission requirements.

Intensive work schedules were followed. Leisure

time was provided but strictly rationed and a space crew duty shift-system was followed.

These men were subjected to a rough ordeal (but each was chosen for his ability to succeed).

Periodic measurements were made to determine whether or not changes had occurred in the blood of the men, whether there were changes in pulmonary functions, energy and nutritional balance, water balance and psychological stability.—Aviation Medicine Section, BUMED.

Press Conference in session. Left to right: Ltjg Jerry W. Munger, Ltjg. Cyrus W. Strickler, III 1/Lt. Carl H. Yung, USMC; Lt. Kenneth C. Juergens, USN; Cdr. Kenneth R. Coburn, Project Manager; Captain H. G. Wagner, Director, ACEL; Captain S. R. Ours, Commanding Officer, NAEC; Cdr. Roger Ireland, Deputy Director, ACEL; Captain Karl A. Foster, USMC; Ltjg James B. Abbitt, USN; Ltjg. Richard M. Pipkin, USNR; and Ltjg. William R. McBride, USNR.

EJECTION VERTEBRAL INJURIES

LT W. L. Smith, MSC, USNR

For those who have studied ejection statistics, it becomes readily apparent that there is more than one factor which comes into play when ejection vertebral injuries are analyzed. In fact, there may be no listing that can be made of factors in order of their cause due to the variance of factors in ejections and their interplay roles. However, some statistical trends may be shown to occur. These trends can be used in human factors engineering in design guidelines for ejection systems. Furthermore, some trends may show areas in which training emphasis may provide a valuable supplement in reducing vertebral injury incidents in some operational ejection seat systems.

Some major factors involved in ejection seat vertebral injuries include the following:

1. Thrust characteristics of the ejection seat propulsion system.
2. Pre-ejection body position of the ejectee.
3. Shape, retention, rigidity, and resonance characteristics of the survival pack and seat cushion assembly in the seat pan.
4. Harness restraint systems and the related user's wear-condition.
5. Presence of negative "G" at the time of ejection.
6. Dynamic response of the human body to a given input thrust.
7. "Through-the-Canopy" ejections.

It is the purpose of this paper to demonstrate how some of these factors may be causative agents in ejection vertebral injury.

Propulsion Systems

All things being equal, it is a logical assumption that the "softer" the "G" onset and duration of application, the lower will be the vertebral injury incidence. This particular thesis can be proven by looking at the U.S. Navy CY 1964 ejection data where the incidence of vertebral injury in multi-charge catapult systems is consistently higher than for the catapult-rocket systems. For the multi-charge catapult system, there were 79 known ejections with 11 of these having vertebral injury for a total of 14 percent versus the catapult-rocket propulsion system in which there were 56 known ejections with 2 cases of vertebral injury for a total of 3.6 percent. In this paper "known" applies to ejections for which airspeed and/or altitude were known and where the vertebral injury was due to ejection forces.

To provide a fair evaluation of any ejection system, it must be remembered that a measure of its success is its recovery of aircrew personnel. In this context, the same data provides the following:

Propulsion System Type:	Percent-Successful Aircrew Recovery
Multi-Charge Catapult System:	approx. 90%
Rocket-Catapult System:	approx. 80%

Even these data must be taken with caution due to the fact that the statistical sample is small and can be only said to be true for CY 1964. Some of the fatalities represent ejections out of the design envelope of the ejection seat.

Pre-Ejection Position

Pre-ejection position can be a critical factor in prevention of vertebral injuries, but as to what degree is still hard to ascertain. There have been isolated incidents where the ejectee has been in the worst possible pre-ejection position with no vertebral injury occurrence. With reference to the CY 1964 data, only one vertebral injury case can be attributed to mal-positioning. This fact is a credit to the Navy training program conducted at the Aviation Physiology Training Units throughout the fleet. Emphasis on "dry" runs at the squadron level in unarmed seats is also extremely important. The combination of these training programs is essential to point up errors in pre-ejection positioning and ejection initiating techniques.

Survival Packs and Seat Cushions

In the current fleet configurations of this equipment, there is a great deal of variation. Some seat configurations have packs which are separate from the seat cushion, while the cushion itself is located on brackets on the seat pan. Another configuration has the pack which fits the seat pan with shaped cushion tops. The former configuration is found in a multi-charge catapult system in which vertebral injury incident is high; i.e., the TF9J series. For CY 1964 the TF9J had a total of 5 known ejections with 4 vertebral injury cases to provide an 80% incidence of vertebral injury. A more representative figure can be found in a recent study covering four years of ejections in the TF9J. This study indicated a 46% vertebral injury incidence represented by 47 vertebral injury cases of 103 ejection events. The percentage for this particular seat and seat pan/cushion configuration has been consistently high, as much as four times greater incidence, when compared to other multi-charge catapult systems.

Here it is important to point out the very crucial nature of a good one-to-one ratio, man-seat coupling system so that such things as overpeaking of man's output "G" does not exceed the propulsion's input "G". If a "soft" seat cushion is employed for comfort considerations, it is not difficult to obtain as much as a 50% increase in peak "G" force for the man.

Harness Restraint Systems and User Adjust-Condition

The development of harness restraint systems for Navy ejection seats has been directed towards an integrated torso harness concept to provide the best man-seat coupling system available. If the user's adjust-condition with this system is a loose fit, he will find himself in high probability of back injury if he must eject.

A recent study of the Royal Navy versus the Royal Air Force vertebral injury for a specific multi-charge catapult gun system showed that the Royal Navy spinal injury rate is only half that of the Royal Air Force. It was suggested by the author that this difference was due to the way in which the Royal Navy aircrew personnel strap themselves into their seats. Naval aviation personnel are subjected to catapult/arrest "G" forces; therefore, they have the tendency to wear their harness restraint systems in a tight fit condition. A similar conclusion was drawn in the paper "RCAF EJECTION EXPERIENCE 1952-1961" by S/L JR Smiley, C. D., RCAF Institute of Aviation Medicine, which compared similar catapult systems and showed a 17% difference in vertebral injuries for the U.S. Navy versus the RCAF. The 17% higher incidence in fractured vertebrae for the RCAF was attributed to loose-fit condition of their harness restraint systems.

Negative "G"

The presence of negative "G" compounds the problems of trying to provide an adequate man-seat close couple system. In CY 1964 three (3) ejection vertebral injury cases were attributed to negative "G" forces present at the time of ejection. Improved restraint systems may even reduce ejection vertebral injury under negative "G" conditions. If not worn properly, no harness restraint system will provide proper protection at ejection under negative "G" conditions.

Dynamic Response of the Human Body

Simulation programs designed to mimic the human body response to input accelerative forces and resultant functional changes in these forces which occur with seat configuration changes would be of great importance to escape systems designer engineers.

Basic biomedical data is still being collected. Human tolerance curves are subsequently being redefined. With accrual of the above mentioned

data, it is hoped that better understanding of man's tolerance to accelerative force will lead to reduced injury.

"Through-the-Canopy" Ejections

Another contributing factor in ejection vertebral injuries is through the canopy ejections. There is a high coincidence of vertebral injuries with this mode of ejection. A case in point is found in the CY 1964 for the TF9J ejections. Three out of four vertebral injury cases occurred with "through-the-canopy" ejections. Again this sample is small in number but a relationship does seem to exist in the overview of ejection data.

Other Factors

There are many factors which have been mentioned by other authors that have not been presented in this paper. Some of those factors are more difficult to substantiate in the opinion of this author, and therefore have not been mentioned.

Conclusion

There is no common denominator, the removal of which will delete spinal injuries from ejections. Spinal injuries are caused by many factors in which there is interplay of varying degrees. The statistical numbers are not adequate to provide data in which a degree of significance can be placed. The large variety of ejection seat configuration and engineering changes further complicates the job of analysis.

In general, the most important area of consideration for ejection vertebral injuries reduction is in the area of the man-seat coupling system. This means an adequate harness/restraint system adjusted properly, a shaped seat cushion with a hard seat pack with restricted "bottoming", and good pre-ejection positioning of the ejectee.—Aviation Medicine Equipment and Requirement Section, BUMED.

BUMED INSTRUCTION 6110.8

This BUMED Instruction set forth the required anthropometric measurements on aviation physical examinations and revised the height standards applicable to candidates for flight training. The Instruction directed aviation activities conducting aviation physicals to construct the anthropometer utilizing local funds and a set of drawings obtained from the Naval Air Technical Services, Philadelphia, Pennsylvania.

Subsequent to the distribution of BUMED Instruction 6110.8, inputs to BUMED and BUWEPS from a large segment of aviation activities and ships indicated difficulty in funding and fabrication of the anthropometer. Included were a large number of suggestions aimed toward the alleviation of the problem.

Recently the BUMED, BUWEPS liaison officer completed arrangements for centralized funding and procurement of a sufficient quantity of the anthropometers to meet naval aviation requirements. A contract is in the process of establishment whereby the Aerospace Crew Equipment Laboratory, NAEC, Philadelphia, Pennsylvania, 19112, will monitor and distribute complete anthropometers to each user activity upon request. It is anticipated that delivery to ACEL will get under way during October or November 1965.—Aviation Medicine Section, BU MED.

RESERVE SECTION

To: Lieutenant Commander Norman L. Mauroner, MC 474310/2105 USNR–R

Subj: APPRECIATION FOR MEDICAL SERVICES RENDERED

In view of your outstanding devotion to duty and high regard for the physical and mental health of each Marine of Company L, Third Battalion, 24th Marines, 4th Marine Division, FMF, USMCR, Shreveport, Louisiana as the unit Medical Officer, I would like to take this opportunity to express my sincere appreciation for all medical services you have rendered our Marines in that unit.

You have on many occasions devoted long hours, not required of you in your capacity as a Reserve Medical Officer, to the health and welfare of both the Reservists and Regulars within the organization. In addition to your military functions as Unit Medical Officer, you have given up many hours of your private practice in the care of the dependents of the Inspector-Instructor Staff thus eliminating many medical problems for Marine Corps Families in the area.

Your initiative, hard work and devotion to duty have not gone unnoticed. By working your schedule around those of our reservists and regulars coupled with a "Can Do" attitude, you have contributed materially to the overall morale and efficiency of the Shreveport Unit.

Your attention to duty and keen interest in the Marine Corps Reserve Program is in keeping with the highest traditions of the Naval Service and I take pleasure at this time in commending you for your faithful, timely and effective attention to duty as Medical Officer of the Shreveport Marine Corps Reserve Unit.

S/R. L. STALLINGS

LETTERS OF COMMENDATION

To: Commanding Officer, Naval Reserve Surface Division 5–43 (S), Adelphi, Maryland, Active Duty for Training

1. During the period 19—29 April, 1965, the group of four officers and twelve hospital corps personnel of your division have been deployed in an active duty for training status to this command.

2. Your duties in this command have been performed in an outstanding manner both as individuals and as members of our hospital staff. The entire unit displayed a refreshing eagerness to learn and an alert responsiveness to help in all situations when needed.

3. The members of this unit of the Reserve Surface Division 5–43 (S) are commended for their interest and participation in the prescribed training offered. This well trained unit is a credit to the entire Reserve Division and the Naval Reserve. It is through organized efforts such as yours that the spirit of contributing to the strength of our Navy and the nation is exemplified most clearly.

4. I extend to you and the members of the Reserve Surface Division 5–43 (S) a hearty "Well Done". My congratulations and best wishes are offered for continued success in your future endeavors.

5. A copy of this letter will be made a permanent part of the official service records of your unit's personnel.

S/H. A. MARKOWITZ

To: Commander Max C. McCowen, MSC, USNR

1. The Commandant takes pleasure in awarding this letter of commendation to you as Commanding Officer of Naval Reserve Medical Company 9–3. Naval Reserve Medical Company 9–3 attained first place in competition with eleven other medical companies participating in the Ninth Naval District Program.

2. This creditable performance of Naval Reserve Medical Company 9–3, is the result of the high degree of leadership exercised by you as Commanding Officer and the outstanding cooperation and performance of duty by the officers under your command. I commend you, and the officers of your Company, for excelling other Medical Companies in the Ninth Naval District.

3. The Ninth Naval District "First Place Plaque" awarded annually for permanent retention is hereby presented to Medical Company 9–3 in recognition of this achievement.

4. The Commanding Officer is authorized and directed to reference this letter and append a copy thereto on the fitness reports of officers under his command when next submitted. In those cases when fitness reports will not be submitted, a copy of this letter shall be forwarded separately to the Chief of Naval Personnel (Pers E–221) for inclusion in the officers' records.

S/ H.A. YEAGER

MEDICAL AND DENTAL STUDENTS ABOARD USS HUSE

Eighty-five medical and dental students and their dates clambered aboard the New Orleans-based destroyer escort USS Huse, March 7, for a day-long cruise on the Mississippi River.

The students, 60 medical students from Tulane University Medical School and 25 dental students from Loyola University Dental School, were encouraged to bring their wives or sweethearts on the cruise so that not only they, but the ladies as well, would gain an insight into Navy life.

During the cruise the guests observed points of interest along the banks of the Mississippi, watched typical at-sea evolutions, and were treated to a Navy-style buffet lunch on the ship's fantail. CAPT R. K. Brooks, MC, USN, Eighth Naval District Medical Officer, was on hand to answer questions about Navy medicine.

The cruise was the second of its kind originated by Dr. Brooks, who fostered a similar cruise with Louisiana State University Medical students in November 1964. The March 7 cruise was made under the auspices of RADM Charles H. Lyman, USN, Commandant of the Eighth Naval District, and LCDR F. F. Ames, USNR, commanding officer of the USS Huse.—Navy News Release, March 11, 1965.

EDITORIAL DESK

CAPT. VORIS RECEIVES INTERNATIONAL ACADEMY MEMBERSHIP CERTIFICATE FROM ADMIRAL GALANTIN

CAPT Frank B. Voris, MC USN, received the certificate and medallion certifying his membership in the International Academy of Aviation Medicine in ceremonies held in Washington D. C. on March 25, 1965. The presentation was made by Vice Admiral I. J. Galantin, Chief of Naval Material. Captain Voris is Assistant for Medical and Allied Sciences in the Exploratory Development Division of Admiral Galantin's office. Captain Voris—President-Elect of the Aerospace Medical Association, is one of only seven Navy captains who are both medical officers and naval aviators. He has more than 2,600 flying hours as a pilot. Captain Voris, who began his Naval career in 1941, has had varied assignments. After attending the Navy School of Aviation Medicine, he took part in the North African campaign as flight surgeon aboard the escort carrier Sangamon. In 1943, he transferred to Carrier Air Group 3, embarked in the carrier Yorktown (World War II's famed "Fighting Lady"), and participated in seven major engagements and campaigns in the South and Western Pacific. He won the wings of a naval aviator in 1948. Since then, his service has included tours of duty in Hawaii, in the Navy's Bureau of Medicine and Surgery in Washington, D. C., and as senior medical officer aboard the carrier Forrestal. His last prior assignment was as Chief of the Human Research Branch, NASA. Full membership in the International Academy of Aviation Medicine is limited to 200, although current membership is under 100. To be eligible for membership, a candidate must be a doctor of medicine, over 40 years of age, and have more than 10 years' specialization in Aviation Medicine.

—Aerospace Medicine 36(5):494, May 1965.

SECRETARY OF THE NAVY COMMENDS NAVY MEDICAL DEPARTMENT

I should like to acknowledge the outstanding work being done in Southeast Asia by Navy medical personnel. Navy medical officers and enlisted men assigned to the Republic of Vietnam are engaged not only in medical support of our own and South Vietnamese forces there, but in various civic action programs for the benefit of the civilian population. Specialists in surgery, anesthesiology and orthopedics are in particularly heavy demand in Vietnam, and this has increased the already heavy workload for those remaining in this country. Our medical personnel in Southeast Asia are working long hours under arduous conditions. We have asked, and they are giving, the exemplary service which we have come to expect from that skilled and dedicated corps of men and women. —SECNAV Address 7 June 1965.

POSTGRADUATE SHORT COURSES FOR MEDICAL DEPARTMENT OFFICERS SPONSORED BY THE DEPARTMENT OF THE ARMY DURING FISCAL YEAR 1966

The following postgraduate professional short courses will be conducted by the Army Medical Service during Fiscal Year 1966. Officers desiring to attend should submit their requests in ample time to reach the Bureau at least 8 weeks prior to the convening date of the course desired. This lead time is necessary in order to comply with the Army's request to return unused quotas 6 weeks in advance of the convening dates of the courses listed.

Courses	*Installation*	*Date*
Armed Forces Examining Station Examiners	Medical Field Service School, Brooke Army Medical Center	12-19 Aug 1965 20-24 Sep 1965 1-5 Nov. 1965 7-11 Feb 1966 MC
Ophthalmic Pathology	Armed Forces Institute of Pathology	13-17 Sep 1965 MC
Orthopaedic Pathology	Armed Forces Institute of Pathology	27 Sep—5 Nov 1965 MC

Courses	*Installation*	*Date*
Trends in Dental Laboratory Activities	Army Institute of Dental Research, Walter Reed Army Medical Center	27 Sep—1 Oct 1965 DC
Eighteenth Annual Symposium on Pulmonary Disease	Fitzsimons General Hospital	20-24 Sep 1965 MC
Medical Management of Mass Casualties	Medical Field Service School, Brooke Army Medical Center	25-29 Oct 1965 MC
Post Graduate Course in Prosthodontics	Letterman General Hospital	11-15 Oct 1965 DC
Kimbrough Urological Seminar	Letterman General Hospital	25-28 Oct 1965 MC
Preventive Dentistry	Army Institute of Dental Research, Walter Reed Army Medical Center	25-29 Oct 1965 DC
Current Concepts of Medical Support in Future Warfare	Walter Reed Army Institute of Research	15-19 Nov 1965 MC, NC
Introduction to Research Methods	Armed Forces Institute of Pathology	1-5 Nov 1965 MC
Advanced Course in Aerospace Pathology	Armed Forces Institute of Pathology	16-18 Nov 1965 MC
Introduction to Electron Microscopy	Armed Forces Institute of Pathology	29 Nov—3 Dec 1965 MC
Present Concepts in Internal Medicine	Letterman General Hospital	2-5 Nov 1965 MC
Fundamentals of Medical Support in Modern Warfare	Medical Field Service School, Brooke Army Medical Center	29 Nov—10 Dec 1965 MC, NC
Post Graduate Course in Restorative Dentistry	Letterman General Hospital	6-10 Dec 1965 DC
Prosthodontics	Army Institute of Dental Research, Walter Reed Army Medical Center	6-10 Dec 1965 DC
Nursing Practice in the Military	Walter Reed Army Institute of Research	24 Jan—4 Feb 1966 NC
Application of Histochemistry to Pathology	Armed Forces Institute of Pathology	17-21 Jan 1966 MC
Neuropathology	Armed Forces Institute of Pathology	31 Jan—4 Feb 1966 MC
Oral Surgery	Army Institute of Dental Research, Walter Reed Army Medical Center	10-14 Jan 1966 DC
Advanced Medical Operations in Modern Warfare	Medical Field Service School, Brooke Army Medical Center	14 Feb—18 Mar 1966 MC
Surgical & Orthopedic Aspects of Trauma	Brooke General Hospital	7-11 Feb 1966 MC
Advances in Instrument Analysis	Walter Reed Army Institute of Research	21 Mar—29 Apr 1966 MSC
Ophthalmic Pathology	Armed Forces Institute of Pathology	7-11 Mar 1966 MC

Courses	*Installation*	*Date*
Pathology of the Oral Regions	Armed Forces Institute of Pathology	14-18 Mar 1966 MC
Annual Armed Forces Institute of Pathology Lectures	Armed Forces Institute of Pathology	28 Mar—1Apr 1966 MC
Advanced Military Nursing	Medical Field Service School, Brooke Army Medical Center	7-18 Mar 1966 NC
Advanced Pathology of the Oral Regions	Army Institute of Dental Research, Walter Reed Army Medical Center	7-11 Mar 1966 DC
Pediatric Tri-Service Seminar	Walter Reed General Hospital	2-4 Mar 1966 MC
Geographic Pathology of Infectious Diseases	Armed Forces Institute of Pathology	4-8 Apr 1966 MC
Otolaryngology Basic Science	Armed Forces Institute of Pathology	4 Apr—27 May 1966 MC
Forensic Pathology	Armed Forces Institute of Pathology	18-22 Apr 1966 MC
Oral Surgery	Letterman General Hospital	4-8 Apr 1966 DC
Symposium on Current Surgical Practices	Walter Reed General Hospital	4-6 Apr 1966 MC
Oral Diagnosis and Therapeutics	Army Institute of Dental Research, Walter Reed Army Medical Center	2-6 May 1966 DC
Principles of Military Dental Research	Army Institute of Dental Research, Walter Reed Army Medical Center	16-20 May 1966 DC

—Professional Division, BUMED.

AMERICAN BOARD CERTIFICATIONS

American Board of Obstetrics and Gynecology
LCDR Warren J. Jones, Jr., MC USN
LCDR Richard T. Upton, MC USN

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American Board of Radiology, including Nuclear Medicine
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LCDR Richard B. Simpson, MC USN

In Memoriam

RADM Charles "S" Stephenson MC USN (Ret)	9 February	1965
CAPT Malcolm W. Arnold MC USN (Ret)	6 May	1965
CAPT Leon D. Carson MC USN (Ret)	9 January	1965
CAPT Bruce H. McKinney DC USN (Ret)	22 January	1965
CAPT Henry A. Monat MC USNR (Ret)	25 January	1965
CAPT Clarence C. Myers MC USN (Ret)	21 May	1965
LT Howard E. Berry MC USNR	9 May	1965
LT William T. McAlpin MSC USN (Ret)	6 February	1965
LT Edwin Stuart Warrell MSC USN (Ret)	3 February	1965
Chief Nurse Florence M. Vevia USN (Ret)	5 February	1965

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